Automotive industry in the EU10 economies: Developments in the past decade

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Introduction

Following the recent global economic downturn, the position of companies in the automotive industry and their outlook was a major issue regarding the development of consumer markets. This is natural, since the industry employs 5% of all workers in the manufacturing industry of the world (more than 50 million people including suppliers) and thus has significant weight in the global economy. No other manufacturing activities have shown such tremendous development in past decades as automotive investments and no other investments seem to be as important for decision makers.

The purpose of this study is to review the development of EU10 (Czech Republic, Hungary, Slovenia, Slovakia, Estonia, Latvia, Lithuania, Bulgaria and Romania) countries in the past decade in the automotive industry. This study focuses mainly on passenger car production, but also considers other types of road vehicles like light- and heavy commercial vehicles, buses and production of parts and components of the OEMs[92]. The study deals with the structural characteristics of the branch and highlights the differences between productions in EU10 countries by using trade data. Apart from the ten years horizon the study looks back until 1990 when trade integration and liberalization of the capital flows opened a new horizon to the former centrally planned economies in the automotive industry as well. Most of the EU10 countries have a heritage of automotive production (passenger cars, buses, heavy commercial vehicles). Since the beginning of the 1990s, more integrated into the world trade and with the appearance of transnational companies (TNCs), they have been exploiting their capacities differently. The effects of EU integration as well as the effects of the recent economic crisis are also taken into account. A separate section analyses how the automotive industry/production fits into European and global production and global values chains.

Changing global framework and the consequences of the crisis

The world automotive industry underwent a sea change as global production took shape over the past four decades. Back in the 70's when Japanese automotive exports drove U.S. and European manufacturers to slash costs and relocate parts of their manufacturing processes, merely half a dozen countries accounted for the lion's share of production (Sturgeon and Florida, 2000). Growth in global production brought a profound change in the world's car manufacturing.

Whereas only seven countries accounted for 80% of the world's automotive output in 1975, by 2010 there were eleven countries demanding a share of the cake (OICA Production statistics, 2011).[93] Global production also required global players in related industries. An increasing number of new investments have been realized in

[92] An original equipment manufacturer (OEM) manufactures products or components that are purchased by another company and retailed under that purchasing company's brand name. OEM refers to the company that originally manufactured the product. Source: http://en.wikipedia.org/wiki/Original_equipment_manufacturer
[93] The situation in the end of 2013 is the same as in 2010

developing countries with growing purchasing power since expected economic growth and favourable labour costs proved to be attractive alternatives to increase the capacities in the traditional production countries. This trend had a far more limited impact on the output of the central areas (automotive centres) than previously forecasted (Sturgeon et al., 2007). Low labour costs alone were attractive only up until the mid-1990s, not forgetting that the unique, national nature of the automotive industry added weight to political arguments, prompting big assembly companies to provide local, domestic markets with cars manufactured locally (Rechnitzer and Smahó, 2012).

Assembly continues to play a crucial role, since automotive companies are trying to avoid moving a substantial part of existing production to low labour cost countries. In the current crisis European carmakers have felt this expectation growing as governments offered helping hands to several carmakers deemed flagships of the respective national industries. Yet this applies even more to the relocation of existing plants (Tirpák and Kariozen, 2006, p. 6.); new assembly plants are clearly focused on emerging markets (China, India) and on developing areas with lower manufacturing costs (Central and Eastern Europe, Turkey). Changing production figures in China provide a good example of transforming global production focusing on emerging markets. Chinese production increased from 2 million vehicles to 22 million vehicles between 2000 and 2013 (OICA production statistics, 2014a). The increase of production in China totally reshaped the production map (see Table 1): the proportion of the European Union and North America in global production significantly decreased. The decrease was due to stagnation in the European and North-American region against Asian production, which has been increasing sharply since the beginning of the 2000s. Between 2000 and 2013 China became the largest producer in Asia and globally as well. Its production has increased ten-fold.

Table 1: Regional distribution of road motor vehicle production by main regions*
percent of total

Region	2000	2005	2010	2013
EU15	30.0	25.2	17.9	14.8
EU6	2.4	2.9	4.2	3.9
non-EU	2.9	3.7	3.3	3.9
North America	30.3	24.5	15.7	18.9
South America	3.5	4.3	5.3	5.2
Asia	30.5	38.5	52.5	52.3
Other	0.5	1.0	1.1	1.1

*EU15: Austria, Belgium, Finland, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden, UK;
EU6: Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia;
non-EU: Russia, Serbia, Turkey, Ukraine;
North America: Canada, Mexico, USA;
South America: Argentina, Brazil;
Asia: China, India, Indonesia, Iran, Japan, Malaysia, South Korea, Taiwan, Thailand, Uzbekistan

Source: author's calculations based on OICA, 2014a

According to the literature (Humphrey and Memedovic, 2003; Sturgeon and Florida, 2000; Sturgeon and Biesebroeck, 2011; Veloso and Kumar, 2002) we can summarise past trends in world automotive production as follows:

- The spread of vehicle production and sales from the developed world to the developing economies since the 1990's. The markets of developed countries, mainly in the U.S., North America and Western Europe,

became saturated by the late 80's and early 90's, reducing their car replacement absorption capacity as determined by the lifespan of cars. As a result, the past two decades have seen substantial globalisation and consolidation processes taking place in the geographical allocation of production;

- Rapid growth of production and sales came from a few developing countries. These are Brazil and Mexico in the Latin American region, China and India in Asia and the Central European Region;[94]
- Due to technological innovations (platform and modular production) in the 1990's, automakers are planning operations on a global scale. This holds not only for OEMs but for supply chains now designed to be global;
- Because of increasing mergers and acquisitions ownership structure has been changing in the last 20 years. Thanks to geographical presence automotive companies have become global;
- Despite global presence, regional production systems are dominant. Vehicle manufacturers in Western Europe and North America heavily concentrate productions and sales in their home region. On the production side, regional integration is a dominant trend.

In 2013, the automotive industry[95] manufactured nearly 87,3 million vehicles (OICA production statistics, 2014b). The fact that global production of 73 million units in 2007 was reduced by 3.5% in 2008 and further 12.6% in 2009 is a clear indication of the impact of the past crisis. The consolidation period of the markets began in 2010 when automotive production increased year-on-year by 25.6%.

Shrinking output has radically changed production based in the traditional triad (North America, Europe and Japan). The crisis only accelerated the geographical reallocation of production since the 1990s. The European and Japanese output has grown only modestly in the crisis period, while North American production declined. Central and Eastern European countries in total, increased their previous modest production rates. Lately, the industry outlook has been largely determined by the output of the Chinese automotive industry and its growing weight in world production.[96]

When analysing the outputs of individual regions, we have to relinquish some of our reservations concerning quantity-based statistics i.e. compare the regions based on production volume. For the reason that when it comes to the applicability of data, automotive outputs vary immensely, which reflects not only the safety and environmental standards and regulations (CO2 taxation) characteristic of a country or a region, but also the typical features of the given market. For example in the U.S. there is a strong consumer demand for crossover utility vehicles, while in Europe small cars dominate the market (Alliance of Automobile Manufacturers 2014; ACEA 2014b).

China produced nearly the same number of units as Europe, and easily overtook North America and Japan in 2009. Figures, however, do not always reflect actual supply and demand, as sizeable inventories were accumulated during the crisis and inventory sales increased significantly when demand was revived.

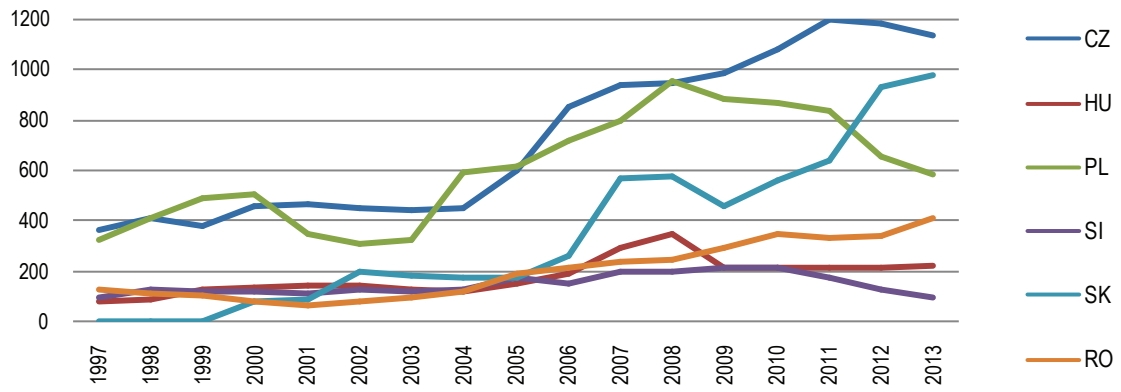
In terms of vehicle types manufactured, passenger cars outnumbered commercial vehicles (accounting for two-thirds). Comparing the output of the two groups, we can see that they responded differently to the downturn: the

[94] Humphrey and Memedovic (2003, p.2.) called it "Eastern Europe" but for geographical reasons we use the phrase Central Europe or Central and Eastern Europe
[95] Production of motorized road vehicles: passenger cars and commercial vehicles
[96] Based on the data of the OICA, in 2013 the Chinese production gives the one-quarter of the world's output.

share of commercial vehicles fell by close to 5 percentage points between 2007 and 2009. But this trend was again a continuation of an already existing trend. Lower demand leading to reduced output led the industry to get rid of (some of) its excess capacities, eliminating mass redundancies resulting from the industry's wide-ranging production structure. The impacts of this elimination hit both production in the parent country and employment at the subsidiaries.

Economic downturn and lack of increase in demand also strongly affected vehicle production in the EU6[97] countries. Figure 1 shows that despite impressive production development in the region, the output of individual countries varied. Since 2008, only the Czech Republic, Slovakia and Romania have been increasing figures. Despite the crisis, Romanian vehicle production has not decreased. Since 2009, the production in Hungary has been stagnating, while Poland and Slovenia have been experiencing decreasing output. Decrease is most pronounced in Poland, where 2013 is the fifth year when Polish car factories were downsizing production of passenger cars and light commercial vehicles (Polish Automotive Industry Association, 2014, p.23.). Regarding Slovenia, decreasing production at Novo Mesto-based Revoz (assembly of Renault cars) affected production figures.

Figure 1: Road motor vehicle production* in the EU6 countries
1000 pieces



* passenger cars + light commercial vehicles + heavy trucks + buses and coaches; excepting semi-knocked-down and completely knock-down assemblies

Source: author's calculations based on OICA, 2014a

The automotive industry in the EU10

This study analyses the automotive industry that includes not only passenger car manufacturing but commercial vehicle manufacturing i.e. production of light commercial vehicles, heavy commercial vehicles and buses as well. Covering the whole spectrum of automotive industry in the EU10 countries is legitimated on the one hand by the increased mergers and acquisitions (M&A) of the commercial vehicle industry in the past years[98]. It results an increased size of the global value chains including the EU10 production sites as well. On the other hand, in some

[97] Czech Republic, Poland, Slovakia, Hungary, Slovenia and Romania
[98] see Volkswagen-M.A.N. and Volkswagen-Scania acquisitions, Volvo Truck merger with Renault Truck, Fiat Industrial merger with Renault bus and tram division

countries production of commercial vehicles and buses gives an increasing share in the automotive industry. In Poland the share of the commercial vehicles (including production of buses) rose from 13.0 % to 18.6 % between 2004 and 2013 (OICA, 2014a). Decreasing share of the production of the commercial vehicles also shows the changing production structure and decreasing number of the actors in the region. Several traditional companies ceased operations because of lack of demand or and changing global strategy of the foreign owner. There are several companies ceased their operations: Ikarus and NABI[99] bus manufacturers in Hungary, Avia commercial vehicles manufacturer in the Czech Republic Jelcz and Autosan bus manufacturer in Poland, TAM commercial vehicles manufacturer in Slovenia.

Referring to OICA statistics (2014a) and the United Nations' List of Industrial Products[100], passenger car manufacturing does not exist in Estonia, Latvia and Lithuania. In Baltic countries, the automotive sector is concentrating more on specialist component manufacturing, rather than the assembly of vehicles (ACEA, 2012). In Estonia some sub-sector companies (Silwi, Baltcoach, Respo Haagised) assemble special vehicles or trailers (Terterov and Reuvid, 2009, p. 132) based on imports, whereas others produce various spare parts for vehicles and subcontract with large automotive companies (Volvo and Scania). The same applies to the automotive sector in Latvia, consisting of small and medium-sized enterprises (Amo Plant) mainly producing car components and trailers. In Lithuania, the situation is similar: the automotive industry focused on the manufacturing of automotive components. More than 400 companies are producing electrical and electronic, metal and plastic components to automotive industry to various OEMs (Invest Lithuania, 2014). Therefore if we compare automotive industry in the EU10 countries to Baltic countries, in the last ten years we can only talk about a supplier industry that has links to the global value chain.

In 2013, nearly 3.5 million vehicles rolled off the production lines (see Figure 1) in the six new EU member countries: the Czech Republic, Hungary, Poland, Slovenia, Slovakia and Romania (OICA production statistics, 2014b). This represents 17.3% and 3.9% of European[101] and world outputs respectively. The EU10 countries' share in European output more than doubled (2,6 times higher) since 2000 and the rate is almost the double (1.7 times higher) of world output. This development is even more dynamic if we also consider that the share of CEE countries[102] in the manufacturing of passenger cars in the European Union has increased more than three-fold from 1996 to 2013 (ACEA, 2014b; OICA Production statistics, 2014a).[103] Looking back, since the European accession production has been increasing from 1.4 million to 3.4 million vehicles per year. Contrary to international trends, the manufacturing of passenger cars became completely dominant in these countries. Compared with the global and European average of 75% and 91% respectively, 97% of vehicles manufactured in the region were passenger cars in 2013. The vast majority of passenger car models assembled in the EU10 countries are so-called economy- or subcompact and compact cars, but premium category vehicles are also manufactured here (in the Bratislava, Mladá Boleslav and Győr plants of Volkswagen, Škoda and Audi Hungaria Motor respectively).

We cannot speak of industrialisation in the case of transition economies, since these countries already had developed manufacturing industries before the change of regime (Inotai 1995). Currently we are witnessing new

[99] North American Bus Industries (NABI) was sold to New Flyer Industries in 2013 and Hungarian production places were closed by 2014.
[100] http://unstats.un.org/unsd/industry/commoditylist2.asp
[101] According to the OICA classification, Europe means EU27 plus Serbia, Russia, Belarus, Ukraine, Uzbekistan and Turkey.
[102] According to the ACEA classification, CEE means Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia.
[103] Referring to OICA (International Organization of Motor Vehicle Manufacturers, www.oica.net) database, In the case of CEE production figures semi-assembled import contents have been decreasing since the beginning of the 2000s. Regarding automotive production, the paper takes into account the double counting method by using net figures.

manufacturing mechanisms and products replacing old technologies. The nature and pace of the transition varies from country to country. The automotive industry tradition is rooted in the period of regime changes in 1990. Production in the former socialist countries – with the exception of the long tradition of the Czech automotive industry – was based mainly on licence agreements (Fiat in Poland, Yugoslavia and the Soviet Union, Renault in Romania) dating from the sixties (Pavlínek, 2008, p.3.). According to UN statistics (UN Industrial Statistics Yearbook, 1990), Central and Eastern European automotive production in 1990 was 699 thousand pieces, which represented 1.7 percent of the world and 3.6 percent of European production at that time.[104] The biggest producers were Poland (309 thousand) the former Czechoslovakia (248 thousand) and Romania (110 thousand). Production in Bulgaria (24 thousand) and Hungary (9 thousand) was more modest. However, taking the structure of production into account, we should add some remarks. Eighty-eight percent of Hungary's output came from the production of buses: at the time Hungary was the third biggest bus producer in Europe (excluding the Soviet Union). The former Czechoslovakia - besides having remarkable car production - produced enough trucks to ensure its leading position among socialist countries. Regarding comparability of historical data we should note that Slovenia was part of Yugoslavia while the Baltic States were part of the Soviet Union.

The automotive industry in the EU10 region is rather heterogeneous, despite the more or less similar local resources (tax incentives, low production costs, well-established infrastructure) in the economies. This can be explained - among other things - by the different ways these countries opened up to foreign investors in 1990s, the industrial traditions of individual countries, the outputs of local subsidiaries of international companies.

As a result of the bankruptcies, production may cease (Daewoo Motors' affiliate in Poland) or if a new owner emerges (Daewoo Motors' affiliate in Romania), production might continue.

Mergers of international companies (Fiat with Chrysler, Fiat Industrial with Renault bus and tram division, Volvo Trucks with Renault Trucks, Volkswagen with Scania and Volkswagen with M.A.N.) can modify the international map of production. Bus production of the Italian company Iveco in the Czech Republic has been growing since the merger of the Fiat industrial bus division with Renault bus division, but production ceased in Hungary some years after the acquisition of the Ikarus Rt because of overcapacity. Acquisitions of the Scania and the M.A.N. by the Volkswagen could result in increasing cooperation between the affiliates in the EU10 region or optimization of the production between the production facilities.

Cooperation agreements (Toyota Motors with the French PSA, General Motors with Fiat, General Motors with Suzuki) created new production plants or increased the previous production. In the Czech Republic the Japanese-French TPSA presented their cooperation producing a new mini city car. Cooperation with the Japanese Suzuki and the General Motors owned Opel results in the production of a mini car in Hungary and Poland with the same platform but different brand.

To ensure their market presence and to boost their competitiveness (Dunning, 1993) the big European and overseas carmakers use the specific attributes of the region to relocate some of their activities, just like companies from the Far East do. Mainly Japanese (Suzuki Motor, Toyota Motor) and South-Korean (Daewoo Motors, KIA-Hyundai) or Chinese (Great Wall Motors) companies have set foot and established a stronghold for their expansion into Western Europe (Hyun, 2008, p. 226.).

Ten car manufacturing companies from Japan to the U.S. and another half dozen automotive firms (in the bus and truck industry) currently have almost three dozen production sites throughout EU10 countries (see Table 2).

[104] Europe and the former Soviet Union.

Almost every main carmaker and their suppliers, which account for 80% of world production, are present in the region. It will come as no surprise that given developments in the 2000s, the region has been labelled the "new Detroit" (Unicredit, 2007).

Table 2: List of automotive companies in EU10 countries in 2013*

parent company	subsidiary	location (country/city)	founded/ purchased	production	workforce	export share as total
Volkswagen AG/AUDI AG	Audi Hungaria Motor Kft.	HU/Győr	1994/2020	engines, parts, car assembly	10,000	99.8%
Daimler AG	Mercedes-Benz Manufacturing Hungary Kft.	HU/Kecskemét	2008	car assembly	3,119	99.7%
Suzuki Motor Corporation	Magyar Suzuki Zrt.	HU/Esztergom	1991	car assembly	2,930	91.5%
General Motors Europe Ltd.	Opel Szentgotthárd Autóipari Kft.	HU/Szentgotthárd	1991	engines, components, remanufactures transmissions	680	95.0%
Kühne Zrt.	Kravtex Kereskedelmi Kft.	HU/Győr	1992	buses	400	
General Motors Europe Ltd.	General Motors Manufacturing Poland Sp. z o.o.	PL/Gliwice	1998	car assembly	2,930	96.5%
	General Motors Powertrain Poland Sp. z o.o.	PL/Tychy	1996	engines	550	
Toyota Motor Corporation	Toyota Motor Industries Poland Sp. z o.o.	PL/Jelcz-Laskowice	2002	engines	798	
	Toyota Motor Manufacturing Poland Sp. z o.o.	PL/Wałbrzych	1999	engines, transmissions	2,040	
Volkswagen AG	Volkswagen Poznan Sp. z o.o.	PL/Poznań	1993	components, car assembly	6,800	98.5%
	Volkswagen Motor Polska Sp. z o.o.	PL/Polkowice		engines	1,215	
	Sitech Sp. z o.o.	PL/Polkowice		components	1,640	
Fiat Automobiles S.p.A.	Fiat Auto Poland S.A.	PL/Bielsko-Biała	1971/1992	engines, components		
		PL/Tychy	1971/1992	car assembly	3,340	99.5%
Ukrainian Automobile Corporation JSC	Fabryka Samochodów Osobowych S.A.	PL/Warsaw	1951	components		
Solaris Bus & Coach S.A.	Solaris Bus & Coach S.A.	PL/Bolechowo	1996	buses, trams	2,000	77.6%
Scania AB	Scania Production Slupsk S.A	PL/Słupsk	1993	buses	747	100%
Volkswagen AG/M.A.N. SE	MAN Truck & Bus Polska Sp. z o.o.	PL/Poznań		buses, components	976	98.5%
		PL/Starachowice	1948/1999	components of buses	1,420	
		PL/Niepołomice-Kraków		trucks	438	76.2%
Volvo AB	Volvo Polska	PL/Wroclaw	1995	heavy trucks, buses	2,300	99.2%
Jelcz	Jelz Sp. z o.o.	PL/Wroclaw	1952	trucks, components	430	

Table 2 (continued)

Fiat Group	Kapena	PL/Włynkówko	1968/2003	buses		
Solbus	Fabryka Autobusów Solbus Sp. z o.o.	PL/Solec Kujawski	2001	buses	150	
Volkswagen AG	Škoda Auto a.s.	CZ/Mladá Boleslav	1895/1991	engines, gearboxes, components, car assembly	20,419	90.6%
		CZ/Vrchlabí	1946/1991	gearboxes	529	
		CZ/Kvasiny	1934/1991	car assembly	3,374	
Toyota Motor Corporation -PSA Peugeot Citroën	Toyota Peugeot Citroën Automobile Czech s.r.o.	CZ/Kolín	2002	car assembly	3,200	99.6%
KIA-Hyundai	HMMC-Hyundai Motor Manufacturing Czech s.r.o.	CZ/Nošovice	2006	gearboxes, car assembly	3,500	99.4%
Tatra	Tatra a.s.	CZ/Koprivnice	1897	heavy trucks, military vehicles	3,000	59.5%
Sor Libchavy spol. s. r. o.	Sor Libchavy spol. s. r. o.	CZ/Libchavy	1991	buses	628	44.0%
Fiat Group	Iveco Czech Republic, a.s.	CZ/Vysoké Myto	1895/1994	buses	2,891	91.9%
Volkswagen AG/M.A.N. SE	PBS Turbo s.r.o.	CZ/Velká Biteš	1956/2000	components	197	
KIA-Hyundai	KIA Motors Slovakia s.r.o.	SK/Zilina	2004	engines, components, car assembly	3,900	99.0%
PSA Peugeot Citroën	PSA Peugeot Citroën Slovakia	SK/Trnava	2003	car assembly	3,500	99.5%
Volkswagen AG	Volkswagen Slovakia a.s.	SK/Bratislava	1971/1991	car assembly	8,417	99.3%
		SK/Martin	2000	components	815	
		SK/Kosice	2004	assembly, logistic	168	
Renault S.A.	Revoz d. d.	SI/Novo Mesto	1959/1991	car assembly	2,076	98.4%
Renault S.A.	Automobile Dacia S.A.	RO/Mioveni	1966/1999	car assembly	8,000	93.0%
Ford	Ford Romania S.A.	RO/Craiova	1976/2007	engines, car assembly	4,000	94.0%
Great Wall Motors Co. Ltd	Litex Motors AD	BG/Lovech	2009	car assembly (CKD)	150	

* all data for 2013

Source: data were collected by the author based on ACEA (2014a) and corporate reports

The role of the automotive industry in the EU10 economies has increased tremendously in the past 20 years or so. Its share (manufacturing of motor vehicles: NACE Rev. 1.1 DM34 and NACE Rev. 2 C29[105]) in the gross value added of the manufacturing industry grew almost four-fold from 3.5% in 1995 to 12.8% in 2012[106].

[105] Taking effect from January 19, 2007 and mandatory for EU Member States as of January 1, 2008, the statistical classification of activities in accordance with NACE Rev.2 is indicated as CM, older data is given indicating the old nomenclature.
[106] Eurostat database: National Accounts, 2014

Table 3: Importance of the automotive industry: detailed data of the manufacture of motor vehicles, trailers and semi-trailers (NACE Rev. 2 C29)

Country	Employment (2013)		GVA (2012/see notes)
	Employees (1000)	Percent of manufacturing employment	Percent of the manufacturing GVA
EU28	2 956.3	8.9	9.1*
EU27	2 951.8	9.0	9.1*
Germany	1 097.5	14.2	15.8*
Czech Republic	191.5	15.0	17.9
Hungary	105.1	12.8	17.7
Poland	230.7	7.8	8.1
Slovenia	19.0	9.4	8.1
Slovakia	89.4	16.6	20.1
Estonia	3.9	3.5	4.0
Latvia	:	:	2.1**
Lithuania	:	:	1.4*
Bulgaria	10.0	1.8	2.2
Romania	160.9	9.6	14.7

: not available;
* 2011;
** 2010

Source: author's calculations based on Eurostat statistical database: Employment and unemployment (LFS) 2014 and National Accounts 2014

The economic importance of the industry varies greatly from country to country because the automotive industry in the region is anything but homogeneous. The types of vehicles and the individual models are different, while the value added also varies. The industry is highly important in terms of employment (see Table 3) in the Czech Republic (4.0%) and in Slovakia (3.9%), while in Poland and Romania the share of employees (1.5% and 1.8% respectively) is only less than half of the Czech figure. Hungary ranks in the middle (2.7%). Considering the total share of the automotive industry, i.e., indirect contribution including production and service activities connecting to supplier industries, its share in employment could be 5-6 times the figures cited above (ACEA, 2014b, p.29.).

Compared to employment, the industry has outstanding figures in terms of gross value added (see Table 3). The biggest differences between gross value added and employment rates are in Hungary, Slovakia and Romania. Despite outstanding figures, based on gross value added per employee, it is clear that the region has generally more labour-intensive activities (Barta, 2012, p.57.; Sturgeon and Biesebroeck, 2011, p.188.; Vass, 2005, p.5.). The region has its biggest advantage with regard to production costs. Comparing labour cost levels between Western-Europe and the Central and Eastern European we see that the difference is fivefold, benefitting the CEE countries (PWC, 2013). Geographical proximity to the main markets is also a crucial factor investing into the EU10 countries (Schmitt, A. - Van Biesebroeck, J., 2013).

The engine of economic growth in the EU10 region is the expansion of exports (from this point of view, Poland with its sizeable domestic market is an exception). Thanks to FDI, the corporate sector and the export focus of the countries increased in the CEE region (Djankov and Hoekman, 1996; Jensen, 2002). Earlier, in the first half of the 90's, the most typical investments were labour intensive and generated lower added value; these were followed later by major investments in electronics and machine manufacturing representing higher technological

levels (Barta, 2012). The automotive industry has an outstanding position regarding foreign capital invested in the EU10 region: the industry has exceeded 40 billion USD FDI in the past two decades (Pavlínek et al., 2009). As a result, production value in the manufacturing of motor vehicles increased sharply; by fivefold between 1990 and 2013 (UN Industrial Statistics Yearbook, 1990; OICA, 2014a). Making up for lost time, Slovakia attracted record FDI from the late 90's, as a result of which the industry grew seventeen-fold, which was unprecedented in the region in the aforementioned period.

Other studies have tried to measure the significance of the industry by quantifying its contribution to economic growth. Tirpák and Kariozen (2006) measured the GDP contribution of the passenger car industry[107] . In 2005 the highest level is in the Czech Republic and Slovakia, where it lately has explained about one fifth (19% and 23% respectively) of total GDP growth. In Hungary the industry contributed only 4.3 percentage points and in Poland only 2.2 percentage points compared to the actual GDP growth.

In addition to local market-seeking motives (Volkswagen, 1991, p. 11.), automotive investments in EU10 countries built their capacities largely on exports. For example, 98-99% of the Czech automotive output was exported in 2013 (AIA, 2014). The export rates in 2013 for the different companies vary from year to year; while the biggest exporter is Škoda Auto, which exports 90.6% of its production, the Japanese-French Toyota Peugeot Citroën Automobile (TPCA) group exports 99% of its production. The rates are very similar in Hungary, Slovenia and Slovakia as well (see Table 2). What is more, in spite of its rather large domestic market, Poland has also similarly high export rates.

Foreign trade linkages are influenced by the intra-firm positions of the affiliates in global production chains of the foreign firms. Regarding export directions, the most "EU dependent" countries were Slovakia and the Czech Republic in 2013, with 82.6% and 80.8% of all exports respectively. On the other side the least "EU dependent" countries are Lithuania and Bulgaria with 40.1% and 44.6% respectively. Germany is the biggest partner for all countries except for the Baltic economies, where the eastern dimension (neighbor countries and Russian Federation) dominates. Trade relations are also influenced by geographical location. For Estonia, the largest EU trade partners are Sweden and Finland. In the case of Latvia and Lithuania, mutual trade is most important in the EU. Southern linkages are evident in the case of Slovenia, where the fourth biggest partner is Italy.

The product structure of foreign trade changed dramatically in the transition countries as early as in the first half of the 90's (Havlik, 1996). Given the product specialisation in the sector, certain activities in the manufacturing industry (manufacturing of iron and steel products, textile and chemical industry, manufacturing of machinery and vehicles) had a greater weight in exports compared to the previous period. The product structure of foreign trade is also influenced by the fact that in addition to electronic parts (manufacturing of electric machinery and equipment – DL) the manufacturing of vehicles (manufacturing of motor vehicles – NACE Rev.1.1: DM43; NACE Rev.2.: C29) has also high export intensity (Havas, 2010, p. 3.).

Product classification SITC Rev.3 provided by the World Trade Organization is used in this study.[108] Statistics show that the automotive industry[109] achieved excellent performance in exporting motor vehicles and their components: in 2013 it accounted for 16% of total exports from EU10 countries. This share is around three

[107] Tirpák and Kariozen (2006) used the phrase "car industry" to describe the passenger car production.
[108] http://stat.wto.org/StatisticalProgram/WSDBStatProgramTechNotes.aspx?Language=E
[109] Automotive products: motor cars and other motor vehicles principally designed for the transport of persons (other than public transport type vehicles) including station wagons and racing cars, motor vehicles for the transport of goods and special purpose motor vehicles, road motor vehicles, n.e.s., parts and accessories of motor vehicles and tractors, internal combustion piston engines for vehicles listed above, electrical equipment, n.e.s., for internal combustion engines and vehicles, and parts thereof (SITC groups 781, 782, 783, 784, and subgroups 713.2, 778.3).

percentage points higher than in 2000. The weight of the industry in exports varies considerably from country to country. It has the highest share in Slovakia, where it accounted for more than one quarter of total exports (see Table 4). At the other end of the scale we find Bulgaria, where vehicle manufacturing played a continuously increasing role in external trade despite the share of the industry in exports being a mere 1.7% in 2013.

Table 4: Share of automotive products in the exports of selected countries
percent

Year	BG	CZ	EST	HU	LT	LV	PL	RO	SI	SK
2000	0.4	16.4	1.8	17.2	2.6	0.5	13.0	1.9	12.3	20.3
2001	0.4	16.8	2.5	17.4	5.1	0.7	12.3	2.1	11.8	18.0
2002	0.5	17.0	3.2	17.1	6.9	0.9	12.9	2.5	12.9	19.6
2003	0.4	16.5	3.2	13.7	5.4	0.8	13.7	2.6	12.1	27.5
2004	0.4	15.6	4.1	13.4	4.8	1.2	16.6	3.2	13.5	23.0
2005	0.6	17.4	5.0	16.5	5.2	2.4	16.7	4.9	16.3	18.1
2006	0.4	17.9	5.1	17.7	7.3	4.5	17.0	6.6	15.2	19.8
2007	0.6	17.7	6.7	18.0	8.2	5.1	16.9	8.7	18.8	23.3
2008	0.7	16.7	6.1	16.7	6.4	5.3	17.5	8.5	18.1	21.8
2009	1.0	18.7	4.4	14.6	5.4	5.0	17.9	12.2	18.4	20.2
2010	1.5	18.5	3.8	14.4	5.9	4.4	15.7	12.5	16.7	21.0
2011	1.7	18.5	3.3	14.8	6.5	4.8	15.5	12.1	15.6	22.3
2012	1.4	18.6	3.2	15.7	5.4	3.8	13.5	13.1	14.6	24.7
2013	1.7	19.2	3.3	17.3	5.2	2.9	13.1	15.2	14.5	26.1

Source: author's calculations based on Eurostat Comext 2014

Regarding export destinations of the automotive products, Germany has key role. Germany is the biggest trade partner for seven of the EU10 countries (see Table 5). The country is not only the biggest market for the automotive companies located in the EU10 countries but German companies (Volkswagen-Audi-M.A.N. and Daimler) have leading role regarding the production. The other trade characteristic is that most of the trade partners are EU15 countries.

The Baltic States have strong economic linkages to the former Soviet republics (Benkovskis et al., 2014). Therefore the main export directions of Baltic countries are neighbour countries and CIS[110] countries. The strength of the eastern relationship is increasing from north to south (see Table 5). The same characteristic applies to Bulgaria where after Germany, neighbour countries i.e. Turkey and Romania are the most important trade partners.

[110] Commonwealth of Independent States

Table 5: Directions of the automotive
the largest partner above 5% regarding the automotive exports

Rank	BG	CZ	EST	HU	LT	LV	PL	RO	SI	SK
1	DE	DE	DE	DE	DE	LV	EE	RUS	DE	DE
2	UK	SK	UK	FR	UK	LT	LT	BLR	TK	FR
3	FR	ES	IT	AT	FR	RUS	DE	KAZ	RO	RUS
4	SK		FR	IT	RUS	SE	RUS	LV	RUS	TK
5	RUS		CZ	PL	CN	FI	SE	KG		IT
6					CZ		BE			UK

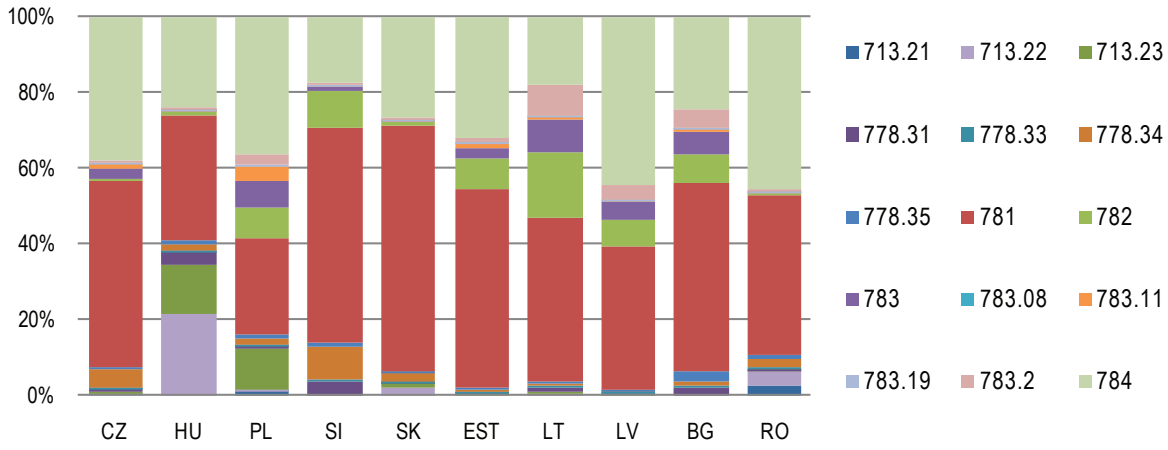
Source: author's calculations based on Eurostat Comext 2014

While the direct and short-term impacts of the operations of foreign companies at corporate and regional levels can be measured (employment, growth in output, encouraging further investment, profits reinvested, growing exports), indirect and long-term impacts do not transform into figures very easily. We can specify expectations which, given the primary impacts, represent vertical and horizontal spillovers of corporate- and industry-level modernisation (preserving jobs, expanding employment, increasing real incomes as well as in-house technology and knowledge transfer (Mišun and Tomšík, 2002, p. 57.)) –. The differences in competitiveness between foreign and domestic enterprises, however, highlight a key problem. They have led to the creation of parallel development tracks, dual economies, (Pavlínek, 2004) and at the same time so-called "cathedrals in the desert" in emerging economies (Morris, 1992; Grabher, 1994, 1997). The quality control (quality, deadlines, cost factors, the 'just in time' system) export-oriented companies are isolated, and establish an insignificant number of relations with domestic companies (Pavlínek, 1998; Pavlínek and Smith, 1998; Swain, 1998); these relations are also tied to the TIER 2 and TIER 3 level of the supply system.

The output structure of the automotive industry

Regarding foreign automotive companies in EU10 countries, the main part of the output (between 90-100 percent) is exported. Therefore this study analyses the output figures of the EU10 automotive industry using export data. Figure 2 shows the proportion of the main groups among automotive products. There are some groups that have a significant share in automotive export. If we consider the mentioned strong export-orientation of production, we can state that the SITC groups' cars (781) and freight transport vehicles (782), parts and accessories of motor vehicles (784), electrical lighting or signalling equipment (778.34) and internal combustion engines (713.22 and diesel 713.23) make up the main part of automotive output. Manufacturing of buses (783.11) is notable only in Poland (Solaris, M.A.N. and Scania); nonetheless, it has only a 4.1 percent share in automotive export. However, the importance of Polish bus production in European bus manufacturing has been increasing since the 2000s. Poland has appeared as the third largest bus manufacturer after Sweden and Germany, and the second largest bus exporter after Germany in Europe at end of the 2010s (Gwosdz et al., 2011). Since 2013, the European production of complete buses of the Volvo bus division has been concentrated at the main plant in Wroclaw in Poland. (Volvo, 2014, p. 42.).

Figure 2: Structure of automotive export in the selected countries
in 2013, in percent of total automotive products



Source: author's calculations based on Eurostat Comext 2014

To analyse the output of the automotive industry, this study distinguishes between two main products: completely assembled vehicles and components/parts. Based on the figures from 2000, 2005, 2010 and 2013, there are certain characteristics of output by different countries. There are countries where production of vehicles (personal vehicles, commercial vehicles, buses) provides the main part of automotive production, while in other countries components (internal combustion engines and gearboxes) and parts dominate output (see Figure 3). There are remarkable shares of vehicle production in Czech Republic, Slovenia, Slovakia and Bulgaria in 2013.

Figure 3: Classification and importance of the automotive industry

Country	Share in export		Product type	
	Weak	Strong	Vehicles	Main parts and accessories
Czech Republic		●	●	
Hungary		●		●
Poland		●		●
Slovenia		●	●	
Slovakia		●	●	
Bulgaria	●		●	
Romania		●		●
Estonia	●			●
Latvia	●			●
Lithuania	●			●

Source: author

In other countries like Hungary, Poland and Romania, component manufacturing provides the biggest share in the output of the automotive industry. Based on firm level data of the national investment promoting agencies (Estonian Investment and Trade Agency, Invest Lithuania), there is remarkable component manufacturing industry in the Baltic countries as well. Regarding long-term data, there are increasing component and parts manufacturing shares in Poland and Slovakia, and increasing vehicle manufacturing in Bulgaria and Romania between 2000 and 2013. Poland has become a parts manufacturer when compared to its position in 2000, when the production of vehicles dominated output. As previously mentioned in t Baltic countries, the automotive sector is concentrating more on specialist component manufacturing. The Lithuanian automotive sector is largely oriented towards specialist component production rather than the assembly of vehicles, with a particular focus on wiring devices.

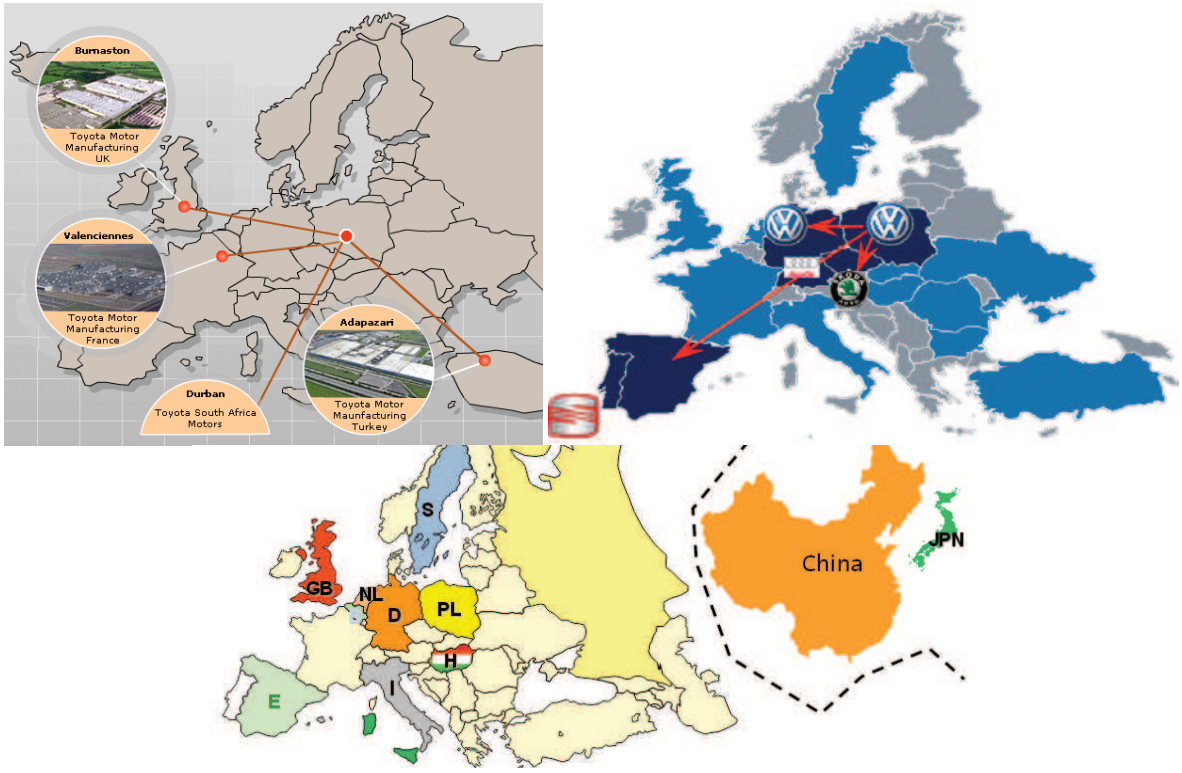
EU10 automotive production as part of the global value chain

Through the increasing export of automotive companies, the foreign trade relations of EU10 economies have also strengthened (see Table 4). However, investigating the trade types of these economies adds a new dimension to the question. Namely, a notable part of the output of the automotive firms (OEMs) in the region is exported as end products or as part of global value chains. As mentioned, these products - namely engines, transmissions and other main components - are massively exported in Hungary, Poland[111] and Romania. For companies operating in countries on the export side, the latter figure can be as high as 82% (Marin et al., 2002).

Manufacture of motor vehicles is considered a high value-added sector. Simkova (2013) highlighted the outstanding performance of the automotive industry among manufacturing activities. Analysis by M. Saito and his co-authors (2013) confirmed that the higher value added in exports inter alia in the EU10 economies is correlated with the presence of global value chains. This is evident in trade figures as well: between 1995 and 2008 the EU10 region increased its share in global value chains from 4.4% to 9.3% (Grodzicki, 2014, p 8.). At this point a question arises: what about the input side of the output? Baldwin and Lopez-Gonzalez (2013), Amador et al., (2013) among others show based on the World Input-Output Database that importing to export, i.e., the share of foreign value added in exports are extremely high in the CEE countries. For 2011, these are above 40% in the Czech Republic, Hungary and Slovakia (Éltető, 2014). These figures confirm that multinationals mainly use their own technology and know-how and do not rely on local technologies (Baldwin and Lopez-Gonzalez, 2013). The automotive industry of the Central and Eastern European region is linked into the global value chains (corporate network) as a supplier and an assembler of the end product.

[111] Regarding intra-firm trade see: Audi Motor Hungaria Kft. and Opel Szentgotthárd Autóipari Kft in Hungary; Toyota Motor Industries Poland Sp. z o.o., Toyota Motor Manufacturing Poland Sp. z o.o., Volkswagen Motor Polska Sp. z o.o., Sitech Sp. z o.o., Fiat Auto Poland S.A. and General Motors Powertrain Poland Sp. z o.o. in Poland.

Figure 4: Trade relations in the global value chain of Toyota Motor Industries Poland, Volkswagen Motor Polska and the Opel Szentgotthárd Autóipari Kft.



Source: Toyota Motor Industries Poland 2014; Volkswagen Motor Polska 2012, p. 6.; Mesics, 2008, p. 8.

In addition to the assembly of vehicles, other activities with high added value in the industry also play a key role, like assembly/production of internal combustion engines and gearboxes. Hungary and Poland excel in manufacturing engines, while thanks to its large number of automotive suppliers, the Czech Republic is outstanding in the manufacturing and export of vehicle components like brakes, safety systems and lighting equipment (Halesiak et al., 2007). Despite its small size, Slovenian automotive suppliers and engineering firms have strong supplier linkages to the European automotive industry (Erenda et al., 2014). Slovenia's automotive industry accounts for 21 percent of the entire exports of the country and notably, 80 percent of what is produced by the industry is exported in 2011[112].

Figure 4 shows the linkages of engine and other component manufacturers previously mentioned. In Poland, the Toyota Motor Industries Poland Sp. z o.o.[113] delivers internal combustion engines to the other Toyota factories located in the U.K. and Turkey cooperates with subsidiaries in France and South Africa. The other Polish subsidiary, Volkswagen Motor Polska Sp. z o.o., also has European relations with German, Czech and Spanish locations as well as with U.S., Mexican, South African and Indian Volkswagen subsidiaries. Hungarian affiliate Opel Szentgotthárd Autóipari Kft., which produces transmissions and engines, has linkages with European production sites regarding engine delivery. For transmission delivery, the main partners are the GM factory in Sliedrecht (Netherlands) and the Chinese GM joint-ventures. The revenue (engines and vehicles) of the Audi

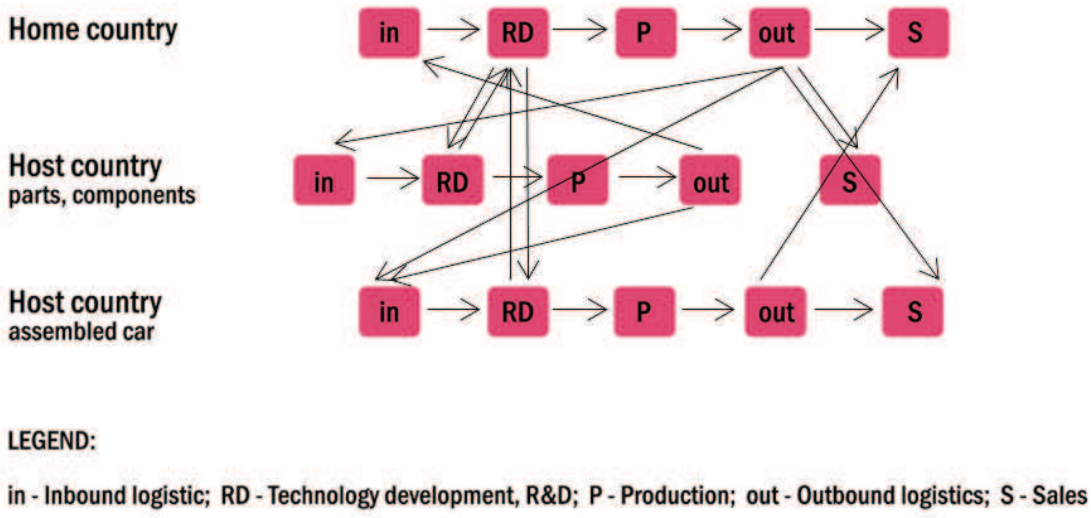
[112] The Slovenia Times (2011): Made in Slovenia: Automotive Industry, 14 Nov 2011, http://www.sloveniatimes.com/made-in-slovenia-automotive-industry/2
[113] Spółka z ograniczoną odpowiedzialnością Polish name for the Limited liability company

Hungaria is predominantly derived from subsidiaries of the Volkswagen Group (Audi Hungaria Motor, 2014, p.12.). Regarding its motor production division, in 2013 Audi Hungaria Motor Kft. has direct linkages (trade relations) to all European affiliates of Volkswagen from Poland to Spain. It also has trade relations with Chinese Volkswagen joint-ventures and Indian affiliates of the company. In 2013, the biggest partner after Audi AG and Volkswagen AG was the Chinese joint-venture FAW-Volkswagen Automotive Company Ltd.

According to the analysis of trade relations between Audi Hungaria Motor Kft. and Volkswagen de México S.A., Túry (2014) identifies some factors that influence the trade intensity between Hungarian and the Mexican affiliates.[114] After examining intra-firm relations of Audi Hungaria Motor Kft., Túry (2014) distinguishes two types of cooperation: joint technological development and intra-firm trade. The company has indirect technological and direct trade linkages with Mexican subsidiary Volkswagen de México S.A. Regarding collaboration in technology development, all development is coordinated by the Volkswagen Group, while trade relations exist between affiliates as well.

In case of intra-firm trade, production facilities in the EU10 countries have direct linkages mostly in the value chain.[115] Trade relations mean delivery of components, delivery of engines and transmissions and delivery of finished products. Based on Porter's idea (1985), Schmid and Grosche (2008) distinguished four stages of the automotive industry: procurement, R&D, production and sales. Based on this, Figure 5 shows the linkages of EU10 subsidiaries to the global value chain.

Figure 5: Linkages in the value chain



Source: author, based on the idea of Schmid and Grosche 2008, p. 19.

[114] There are internal factors like global vehicle model change, capacity problem (bottleneck) of the Mexican affiliate, economies of scale by production of certain engines and outcomes of intra-firm competition among the affiliates that have an influence. Last but not least, external factors like the trade liberalisation agreement between the EU and Mexico increased trade volume. Most of the factors are internal firm issues that influence volume and trend of trade relations in the global value chain.

[115] Regarding the share of export in the sales of EU10 affiliates, they have mostly foreign relations

Outlook

EU10 countries' international proportions were strongly affected by the wide exposure of the region's economy to external markets. These are not only EU markets but via the global value chains (production and sales network), third countries as well. EU markets account for some 60 to 83% of total automotive exports in EU10 countries, and the dependence on imports is also significant. To make the picture even more complex, recent growth trends seem to suggest that new EU member states are not synchronised with one another, and what is even more surprising in light of the high level of intertwining, they are out of sync with the average growth trends of older Member States too.

When the international financial and economic crisis spilled over into Europe, EU10 countries found themselves in a highly vulnerable situation. The previous economic figures were based on the growing (export) performance of one or two key industries, which causes small problems during a short period of economic downturn but wreaks structural havoc at national level in a massive recession like this. While in the U.S. markets, crossovers vehicles[116] have the biggest share of the cake (Alliance of Automobile Manufacturers, 2014) in sales, the demand for small cars is highest in Europe (ACEA, 2014b), and fuel-efficient cars with lower consumption were much sought after. In this segment, the European market is strongly influenced by massive quantities of cars produced in EU10 countries.

The outlook for automotive production in EU10 countries is not just dependent on demand in the main (external) markets, but on current global players' structural changes. Slumping sales figures in traditional markets encourage carmakers to relocate production to emerging markets. Over the past couple of years the industry has undergone substantial changes, not only in terms of geographical (regional) allocation of production but also in terms of major technological development in certain countries. Ramping up their production, China and India now have technologically more advanced models to make them increasingly worthy competitors of carmakers in developed countries. In recent years Chinese and Indian companies had several successful businesses acquire majority stakes in European manufacturers[117], providing access to a significant portion of current technologies and developments. This latter presents a strategic issue because - for example - it thwarted the sale of Saab Automobile to a Chinese consortium. (The purchase was blocked by former owner General Motors, which opposed the transfer of technology and production rights to a Chinese company.[118])

The outlook for EU10 plants closely integrated into the global car manufacturing system is determined both directly and indirectly by international automotive processes. Changes have brought about a consolidation of automotive players but are also key to their future competitiveness. In addition to acquisitions and fusions since the 1970s (Heneric et al., 2005), further consolidation can be expected, which will primarily take place in the form of technological collaborations between individual companies and within companies as well. EU10 subsidiaries are parts of the international partnerships of their parent companies: in Hungary, GM-Suzuki agreed to manufacture models on a joint platform; the Fiat-GM (Powertrain) cooperation in Hungary and Poland to manufacture engines; and the Fiat-Ford partnership to assemble Ford cars in Fiat's Poland facility. There are also examples of collaboration initiated by plants in the region, such as the Japanese Toyota Motor Corporation

[116] A crossover (CUV) is a vehicle built on a car platform and combining, in highly variable degrees, features of a sport utility vehicle (SUV) with features from a passenger vehicle, especially those of a station wagon or hatchback.
http://en.wikipedia.org/wiki/Crossover_(automobile)

[117] In 2005 the Chinese Nanjing Automobile Corporation acquired some assets of MG Rover Group and Powertrain Ltd, the British Land Rover was acquired by an Indian company Tata Motors in 2008, while Swedish Volvo cars (Volvo Personvagnar AB) have been under the ownership of the Chinese Zhejiang Geely Holding Group since 2010.

[118] http://newsroom.saab.com/news/news/saabautomobilefilesforbankruptcy.5.33e35a55134420c33657ffe39.html

collaborating with the French PSA Peugeot Citroën for city cars manufactured in a Czech plant. Or sometimes it is regional cooperation that brings about international cooperation (Audi models assembled in India in the local Škoda facility[119]). Due to geographically concentrated but highly diverse activities in the region, there is an excellent basis for in-house cooperation in the industry. Some of the German Volkswagen engines manufactured by Audi Hungaria Motor Kft. are built in the company's Czech and Slovakian plants, while the Czech (Hyundai) and the Slovakian (Kia) plants of the Korean Hyundai Kia Automotive Group have set up a joint supplier system.[120]

The future points to further standardisation of products and production of vehicles. Introduction of the MQB[121] platform system by Volkswagen beginning in 2012 – which was based on a formerly installed platform and modular system – led to more uniform production. However, there is a higher flexibility in production through standardisation, meaning utilisation of the concept within plants and across brands and locations (Volkswagen, 2012). There is no question that those manufacturers that organise their production and sale globally, will be more competitive. Therefore, individual production plants – including subsidiaries in the EU10 countries – of the companies could be more involved in the global value chain of the company.

The joint funding of necessary R&D projects is crucial not only in terms of financial background but also when it comes to sharing risks. This does not only mean mutual utilisation of identical components of certain models, but also far-sighted developments such as replacing the current combustion engine drive train. Thinking about the future, companies agreed to cooperate in the hope of gaining competitive edges and future market niches (Toyota[122]-Daimler[123]-Tesla Motors, PSA Peugeot Citroën-Mitsubishi[124]), which is paving the way for alternative drive technologies to replace traditional fuel-powered technologies. In addition to the industry itself, the crisis has redrawn market demand as well.

Summary

In the last decade and a half we have seen tremendous development in automotive capacities in EU10 countries. Total production has been increasing 2.5 fold to 3.5 million vehicles from 2000 to 2013. There are countries where automotive products became dominant export products and there are countries where the industry has only a small proportion of exports. The structure of production is also different between countries. In some countries the vehicle assembly is the main activity, while in other countries, the parts and components provide the bulk of output. Common to these countries that almost 100 percent of output goes to exports. Regarding international trade, intra-firm trade i.e. trade within the global value chain is the main organising principle. Intra-firm linkages mean trade with finished vehicles and also with parts and components not only with European, Asian and transatlantic affiliates, but with global markets as well. Therefore, the outlook of the automotive industry in the EU10 region indirectly depends on the development of global markets.

Also, sectoral development programmes of the EU member states (the so-called scrappage schemes) could give fresh impetus to the European automotive industry in the short run, but they are certainly not an alternative in the

[119] Audi AG 2010: Annual Report 2009 p. 133.
[120] http://worldwide.hyundai.com/company-overview/news-view.aspx?ListNum=4&idx=45&page=1&strSearchColumn=&strSearchWord=slovakia
[121] Modularer Querbaukasten i.e. Modular Transversal Toolkit
[122] http://pressroom.toyota.com/pr/tms/tesla-motorsand-toyota-motor-159048.aspx?ncid=11092
[123] http://techcrunch.com/2009/05/19/tesla-worth-a-half-billion-dollars-after-daimler-investment/
[124] http://www.psa-peugeot-citroen.com/en/psa_espace/press_releases_details_d1.php?id=1122

medium term. EU funds designed to promote community transit could help some sectors of the industry stay afloat.

In addition to presenting competitiveness and market growth challenges, opportunities faced in the European and U.S. automotive companies may be able to rearrange the map of production. The strengthening market and production positions of China, India and Russia have a double-edged impact on the EU10 region. The outlooks depend partly on the position of the region, the strategies of European and U.S. companies in the short term and the development of Chinese and Indian companies and foreign companies in Russia in the medium term. Future trends will be influenced by the acquisitions, fusions, sales and collaborations within the industry, which have already benefited the region in the form of several joint developments.

New production methods and technological inventories also influence the global production map. In the EU10 region as in others, the implementation of modular production means more opportunities for subsidiaries to engage in increasingly diverse ways in the global value chain.

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